

zontal effects of distribution. I am studying the genus *Lycana* and think many names will eventually have the same value as those under *pseudargiolus*, of which we now have nine names. They represent what many of the others will in the future—gradational geographical forms and seasonal variations. When people put date and locality on the pins we will be able to find out these things. I have expressed my views in regard to *Pamphila*. See Can. Ent., Vol. XXVII, p. 261. The variations of *comma* should not be entitled to specific value. The species in *Nisoniades* are in bad shape and need careful study. I believe we have some synonyms among them. The species of *Aegiale* are interesting, and may be modifications produced by season, condition of food plant, etc. *Neumoegeni* is a very distinct species. The others are more nearly related.

DESCRIPTION OF THE LARVÆ OF SOME HETERO- MEROUS AND RHYNCHOPHORUS BEETLES.

(Plate IV, Figs. 1-6)

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The following descriptions have been written for the sake of making known to American students the immature stages of some of our beetles. In view of how little has been done in this country, it will not surprise most Coleopterists to hear that they all belong to genera in which none of the species peculiar to our continent have yet been studied in the larval state.

Nearly all of the details are from camera-lucida drawings of balsam mounts; they are, however, not all on the same scale, being made from time to time as leisure offered and with different instruments.

Megeleates sequoiarum Casey. (Fig. 1.)

Larva cylindrical, elongate, tapering slightly to each end. Color in spirits yellowish, head somewhat darker, mouth parts castaneous. Length 16 mm. Head barely perceptibly narrower than the prothorax, sides rounded, front nearly vertical, flattened. A distinct ridge runs down on each side of the frontal declivity to the base of the mandibles. The ocelli are situated on the upper or posterior portion of this ridge and are connected with each other by a transverse, very tortuous raised line. Antennæ situated exterior to the mandibles, apparently four-

jointed, although what appears as the first joint may possibly be merely a cephalic process. The second and third joints are of about equal length, though the third is of much less diameter; the fourth is small and springs from a termino-lateral point instead of from the center of the tip of the third. Mandibles very heavy; in lateral outline they show a strongly bidentate tip, while the inner edge near the base is serrate. One mandible (in a balsam mount) shows also a strong tooth just above the serrated portion. Maxillæ with subcylindrical outer lobe, which is somewhat smaller toward apex; inner lobe sub-reniform, face with numerous shortish spines; palpus 3-jointed, joints not greatly differing among themselves in length but decreasing gradually in thickness. Mentum slightly elongate, truncate at tip, ligula with sides oblique from the base to the broadest portion, which is slightly posterior to the point of insertion of the palpi; angles rounded, apex with median prolongation bearing at tip a pair of rather short divergent bristles; palpi two-jointed, the second joint slightly shorter and much more slender. A dissection exposing the upper floor of the labium shows a basimedian parabolic band of pubescence (see Fig. 1, mt.), surrounding a strong brown chitinous piece, articulated to another support at its posterior extremity. A similar structure is found in the mouth of *Hymenorus*. Clypeus about twice as broad as long, narrower anteriorly, angles rounded; labrum somewhat semicircular in outline, surface bristled as shown in figure.

Prothorax longer than the meso or metathorax, the last two about equal to each other. Abdomen of nine segments, the first seven differing but little in length among themselves, the eighth a little shorter, the ninth much so; it is terminated by a pair of short spines springing from the dorso-posterior margin. Legs short, coxæ conical, trochanters triangular in lateral view, outer side much the longest, femora broader at tip, tibiæ narrowed to apex, claw curved, simple, bearing two bristles near the base on the lower surface. Spiracles nine, the largest situated near antero-lateral mesothoracic margin; segments one to eight of the abdomen, each with one near the latero-median point.

The specimens described were given me by Dr. F. E. Blaisdell, who obtained them in woody fungi in Calaveras Co., California.

***Meracantha contracta* Beauv.** (Fig. 2.)

Form elongate cylindrical, not tapering; color yellowish or brownish, the head and dorso-median portions of all the segments darker, ventral surface paler than the upper. Length of full grown specimen 19 mm. Head slightly narrower than the prothorax, shining, rather

finely and not densely punctured; there is an impressed line on the front extending in a parabolic course from the base of one mandible well up on to the vertex, thence curving around and running down to the other mandible. Bristles few but long. Antennæ four-jointed, first joint much broader and somewhat longer than the second, which is in turn slightly broader but much shorter than the third; fourth joint very small, tipped with one long and two short bristles. Ocelli are situated on the sides of the head behind the bases of the antennæ. Labrum transverse, sides rounded, anterior margin truncate and slightly sinuate, angles broadly rounded. There are three long bristles on each side and a series of about fourteen shorter ones around the margin. Mandibles very heavy and strongly toothed; a side view is figured; other aspects show that the tip is emarginate or bidentate. Maxillæ armed on the inner face with a regular series of strong spines; there are also a few smaller scattered spines on the surface. Palpi three-jointed, first and second joints about equal in length, the latter narrower, third joint smaller and shorter. The second joint bears two very long bristles, the others are smooth. Mentum subcordiform in outline, ligula very small, tipped with two short spines, palpigers broad, palpi heavy, the first joint much smaller than the second.

Prothorax about twice as long (on dorsal surface) as the mesothorax, the anterior side margin oblique, so that the segment is shorter on the ventral surface than on the dorsal. The scute is slightly roughened, but shining, the whole anterior margin marked with very fine longitudinal rugosities. The mesothorax is short, the metathorax about one-half longer, surface sculptured like that of the prothorax except that there are none of the fine longitudinal rugosities. Abdomen of nine segments, the first eight of which are almost alike, very convex above, ventral surface with a deep longitudinal impression each side. Ninth segment obliquely truncate and deeply excavated on upper surface, the excavation coarsely rugose, ventral surface with numerous bristles. From the region of the suture between this segment and the eighth protrudes on the ventral aspect a small brown semicircular plate, tipped by two papillæ. Spiracles in nine pairs, the largest being situated on the under surface of the mesothorax in front of the coxæ, while the remainder are found on the abdomen near the anterior margin of the sides of segments one to eight. Legs moderate, not differing much in length among themselves, the anterior pair a trifle stouter, coxæ very prominent, claw sharp, curved in lateral aspect (it is twisted out of place in the camera-lucida drawing) and armed beneath with two spines or bristles.

These larvæ are found occasionally about rotten wood near Iowa City and are remarkable for the shape of the last abdominal segment. The change to pupa takes place in April, one of mine pupating on the twenty-second of the month, the beetle appearing on May fourth. The pupa is white, lying naturally in a curved position. Length, measured along the chord of the arc, 14 mm. The sides of the abdominal segments are armed with flattened processes, bearing each a short spine at tip; these processes are two in number on each side of the second, third, fourth and fifth segments; on the first segment there is but one, a short one, while the single one on the sixth is of moderate size. The last segment is excavated above and armed with a pair of long sharp terminal spines.

Hymenorus obscurus Say. (Fig. 3.)

Larva very elongate, slender, subcylindrical; back very convex, venter flattened, and with a longitudinal furrow on each side. Color, in life nearly white, in spirits yellowish, surface shining. Length, 12 to 13 mm. Head about as wide as the prothorax and of darker color than the rest of the body, antennæ four-jointed, first and second joints about equal in length, the first broader; third joint about one and one-half times as long as the second, rounded at tip, a ring of small spines surrounding the subterminal enlargement; fourth joint small, papilliform, trisetose at tip. Labrum more than twice as broad as long, sides rounded, apex truncate or very slightly emarginate, margin bristly, a few scattering spines on the surface, under face with a parabolic band of small spines (See Fig. 3 lbr.). Mandibles very heavy, deeply emarginate, strongly toothed, and with a broad basal molar portion. Maxillæ with two rows of very strong spines on the inner face, as well as numerous scattered ones. Palpal joints decreasing gradually in thickness, apparently four in number, as shown in Fig. 3 max.; there is, however, some slight damage done to the basal portion in my preparation, so that I do not feel quite sure. The last joint has a fringe of small spines around the tip. Labium of moderate size, palpi thick, second joint narrower; the prolongation of the tip of the ligula is of considerable size, nearly reaching to end of first palpal joints, and bears at apex two bristles about equalling it in length. The chitinous supports are two—the basal piece about as broad as long, rounded at base, rather deeply emarginate and distinctly sinuate at tip, angles prominent; the apical piece elongate, narrow and deeply notched at tip. Prothorax longer than the mesothorax and metathorax, which are about equal to each other in length. The mesothorax bears a spiracle on

each side in front of the coxæ. Abdomen of nine segments, the first eight about equal in size, each bearing a pair of spiracles, which are situated near the antero-lateral margin; ninth bluntly conical, bristly, beneath with a pair of papilliform appendages projecting from beneath a plate lying near the anterior margin. Legs moderate in length, very bristly, coxæ very prominent, claw not toothed.

The larvæ were found in a rotten oak stump, and were at first taken to be Elateridæ. The change to pupa took place April 27th, the beetle appearing May 6th. The pupa is white, 7 mm. long; sides of abdomen with compressed three-toothed processes; terminal segment with two short curved spines.

***Acamptus rigidus* Lec.** (Fig. 4.)

Living larva white, head yellowish, mandibles castaneous. Form rather short, robust, position at rest, curved. Length 5 mm., width almost 2 mm. Head large, deflexed, oval in frontal view. A rather deep impressed line runs the length of the median region above. Surface rather sparsely bristly, the bristles longer and more numerous near the sides. The antennæ cannot be made out distinctly, but are very short and borne in pits over and outside of the mandibles. Eyes are wanting. Mandibles heavy, triangular, strongly chitinized, inner edge sinuate and with a strong tooth near the tip. Maxillæ heavy, basal portion furnished on the masticatory face with several (eight or nine) strong articulated spines; palpus two-jointed, the joints thick, basal one the thicker and somewhat the longer. Mentum mostly membranous, the basal portion therefore indistinctly limited. The terminal part bears four moderate spines at tip; the palpi are two-jointed, the basal joint much the longer. Thoracic segments membranous, broader than the head; they do not bear legs, but each has on the ventral surface a pair of large tubercles which bear ambulatory bristles—about six to each tubercle but not all of the same length. Abdominal segments not well differentiated from the thoracic, soft in consistence, the terminal one obtuse. All the segments are bristly towards the sides, and on the back are seen four long bristles which arise near the tip of the abdomen. The median portion of the ventral surface is devoid of them. The dorso-terminal portion of the abdomen has a squamose appearance, but under a high power these apparent squamules are seen to be short sharp spines.

Larvæ were sent me by Mr. A. B. Wolcott from near Bloomington, Illinois; they were taken, March 13th, from the interior of a soft maple tree. According to Mr. Wolcott's account, this tree had received, at a

point about five feet from the ground, an injury which had removed the bark, the exposed place then being attacked by the large horn-tail, *Tremex columba*. For about an inch from the surface the wood was quite hard, but inside of this shell was quite badly decayed and soft. The young *Acamptus* larvæ were found just entering the soft wood on sides of the *Tremex* burrow, while the large ones were taken at the end of a gallery of an inch or two in length, this gallery having its origin from the side of that of the *Tremex*. The full grown larvæ had formed, at the date mentioned, rounded cells, apparently for pupation; these cells had no evidence of silk in their construction. Mr. Wolcott has kindly furnished a drawing to illustrate the work of this larva (Plate IV, Fig. 6). The burrow of the *Tremex* is shown at Tr, while that of the *Acamptus* is marked Ac. The black spots in the latter show where the larva had made short secondary burrows for the depth of an eighth of an inch or so. All of the larvæ taken by Mr. Wolcott were found with the head pointing upward, whether the burrow ran up or down. This may simply be the position of rest for the winter. A few adults were taken with the young, at the date cited, but they were more numerous in November preceding. None have been seen on the outside of the tree, nor do any of the healthy trees seem to have been attacked.

Yuccaborus, sp. (Fig. 5.)

Larva robust, natural position curved, consistence soft. Color nearly white, head testaceous, mouth dark brown. Head more strongly chitinized than the rest of the body, its upper surface sparsely bristled, median line distinct for about one-half of the distance from the hind margin when it forks, separating into two lines, one of which extends towards each anterior angle. Antennæ extremely short and contained in pits at the sides of the head near the mandibles. Clypeus separated from the front by a distinct suture; in form transverse, approximately, thrice as broad as long, narrower anteriorly, sides oblique. Labrum as broad as the anterior margin of the clypeus but shorter than the sclerite, sides rounded, bristled as shown in the figure. Mandibles extremely heavy, triangular in outline, the inner margin irregular but without defined teeth. Maxillæ with very heavy base, inner face flattened and armed for about one-half of its length with a dense covering of bristles. Palpi two-jointed, the first joint much stouter than the second. Labia palpi two-jointed, almost like the maxillary; the ligula is emarginate at tip, and each of the projections thus formed bears a bunch of bristles at apex. Prothorax about as long as the meso- and meta-thorax combined,

dorsal shield strongly chitinized and with a yellowish tinge. There are no legs, but each of the thoracic segments bears on its ventral surface a pair of setigerous tubercles which are doubtless locomotive in function. Abdomen increasing gradually in size from the first to the third segment, thence gradually decreasing to the fifth. The remaining segments (apparently three in number) are much smaller than the preceding and decrease more rapidly in size. The eighth segment is deeply and broadly longitudinally sulcate, each of the lateral ridges (one of which bounds this excavation on each side) bearing an elongate setigerous tubercle near the anterior and another near the posterior border. The whole ventral surface of the body is traversed by rather deeply impressed longitudinal lines, which, running crosswise of the segmental incisions, give a somewhat tuberculate appearance to this region. On the dorsal surface the plications are parallel to the segmental incisions. Length 10 mm.

Pupa tolerably closely reproducing the form of the beetle, the head and beak sparsely set with short and sharp spines. The pronotum bears a pair on the median line near the base; on each side of and a little posterior to this middle pair lies another pair, and, still exterior, another. The anterior portion of the pronotum bears one spine on each side near the front margin, separated from each other by a space somewhat less than the width of the head; behind and somewhat to the side of these spines are two others, one on each side. The meso- and meta notum each bear two rows of spines which converge posteriorly. The abdominal segments are armed with transverse rows. Length 12 mm.

Numerous pupæ and adults with one larva were found near Brownsville, Texas, infesting a dead yucca. They occur in the decaying portion immediately underlying the old bases of the leaves. The specific identity of the beetle is not settled, but it may turn out to be the same as one of the Mexican species.

EXPLANATION OF PLATE IV.

- Fig. 1. *Megeleates sequoiarum* Casey.
 Fig. 2. *Meracantha contracta* Beauv.
 Fig. 3. *Hymenorus obscurus* Say.
 Fig. 4. *Acamptus rigidus* Lec.
 Fig. 5. *Yuccaborus*, sp.
 Fig. 6. Piece of wood from soft maple tree, showing burrow of *Acamptus* (Ac.) springing from burrow of *Tremex* (Tr.).

All details are marked alike, viz.—lbr.—labrum; Mt.—labium; Md.—Mandible; Max.—Maxilla; ant.—antenna.